IN THE SPECIFICATION:

Page 2, first full paragraph, has been amended as follows:

Fig. [[13]] 12 is a block diagram showing a prior art that is a conventional and general configuration of a mobile communication system for spread spectrum communication through a wireless communication path, in which a transmitter TX modulates a spreading sequence by binary transmission data b to obtain base band transmission outputs(t) as a transmit-symbol (a time limited signal conveying a sequence often modulated by data is here named by symbol, frame, or symbol frame). The sequence is generated by a spreading sequence generator 1. The output s(t) modulates the carrier of frequency f_0 generated by an oscillator 2. TX transmits the modulated output as a radio-band transmit-symbol to a receiver RX through a wireless communication path. As the spreading sequence, it is general to use pseudo-noise (PN) sequence of the same length (number of chips in sequence) as the spreading factor N. Since Gold code (a set of G sequences) having many code words (sequences) are well known, and used widely as PN sequences, the explanation is described below with G sequences.

The last paragraph bridging pages 3 and 4 has been amended as follows:

Supposing examples of two G sequences to be $g_0(i)$ and $g_1(i)$, they are shown in Fig. [[14]] 13 (a), where i is a time variable showing the i-th chip position. Since G sequence is a binary sequence, the symbol frame waveform is, supposing the sequence length L, a binary L chip impulse sequence (actually, as the chip waveform, instead of impulse without energy, a square wave or a sampling function waveform is used; in the diagram, however, each [[chips]] chip is illustrated by an impulse). As the binary value, usually ±1(V) is used, and +1 and -1 are expressed as + and - herein.

Page 4, first full paragraph, has been amended as follows:

The periodic auto-correlation function (ACF) and aperiodic auto-correlation function (AACF) of $g_0(i)$ are shown in Fig. [[14]] 13 (b), and the cross correlation function (CCF) and aperiodic cross correlation function (ACCF) between $g_0(i)$ and $g_1(i)$ are shown in Fig. [[14]] 13 (c). On the axis of abscissas in the diagram, $\tau$is a shift variable taking an integer.

Page 10, eighth full paragraph, please delete the description of Fig. 11.

The last paragraph bridging pages 10 and 11 has been amended as follows:

Fig. [[12]] 11 (a) is a diagram showing a transmitter base band circuit having a function of transmitting an isolated pilot and Fig. [[12]] 11 (b) is a diagram showing a receiver base band circuit having a data symbol analyzing function with pilot responses in a second embodiment of the invention.

Page 11, first full paragraph, has been amended as follows:

Fig. [[13]] 12 is a prior art showing a diagram of a transmitter and a receiver of a direct sequence spread spectrum communication system.

Page 11, second full paragraph, has been amended as follows:

Fig. [[14]] 13 is a prior art, (a) is a diagram showing Gold sequences used for spreading sequences, (b) is a diagram showing periodic and aperiodic auto-correlation functions, and (c) is a diagram showing periodic and aperiodic cross-correlation functions.

Please delete the paragraphs in its entirety starting at page 16, second full paragraph (paragraph starting with Fig. 2) to page 19, first full paragraph (paragraph before [Production method of ZCCZ sequence family]) and substitute therefor:

Fig. 2 is block diagrams of CDMA transmitter and receiver base band circuits in an embodiment of the invention. Fig. 2 (a) shows the transmitter circuit of the p-th user among users belonging to the k-th cell, in which b_{kpn} is the n-th binary transmission information.

Now, when I bits of b_{kpn} are applied to a binary-multilevel converter SP, SP generates one of 2^I multilevel signals to the corresponding terminal. This output $[b_{kpn}]$ is applied to a code selector CS. CS prepares in advance J pieces of spreading sequences S_{kp}^{j} ($j = 1, 2, ..., J$) and the respective polarity inverted sequences, and generates an output S_{kp}^{j} (or $-S_{kp}^{j}$), by mapping $[b_{kpn}]$ to one of 2J ($= 2^I$) sequences. This is called M-ary modulation. S_{kp}^{j} is applied to a frame expansion circuit FE. FE generates the expanded frame $[S_{kp}^{j}]_E$ by adding the header and tail to sequence $[S_{kp}^{j}]$ as explained in Fig. 1. Using the chip-time position variable i shown in Fig. 13

(a), $[S_{kp}^{j}]_E$ can be expressed as a base-band transmitting output s(i).

Fig. 2 (b) shows the circuit of a receiver, in which the base station of the k-th cell receives a frame, as a synchronously received frame in which the components of transmitting outputs having been transmitted by all of users in this system are multiplexed, and demodulates it. In Fig. 2(b), r(i) is a synchronously received signal, and at a modulator MOD1, the synchronously received frame $r^*(i)$ is extracted by the timing pulse e_{Sf}. Consequently, $r^*(i)$ is applied to J pieces of modulators MOD2 matching to respective sequence S_{kp}^{j} = (j=1, 2, ..., J), and each modulator output is integrated in symbol frame period T by an integrator I_{nt}, and thereby J pieces of output w_j are produced.

The j-th output w_j is the 0-shift correlation output between $r^*(i)$ and S_{kp}^{j}, and if $r^*(i) = S_{kp}^{j}$, then the output takes a normalized value, $w_j = 1$. (This normalization is always adjusted by the received pilot signals.) A hard decision circuit DEC compares J pieces of the outputs, and when the j'-th absolute value $w_{j'}$ is closest to 1 as satisfying the following equation,

$$\left.\begin{array}{l} \Delta w_j = |w_j| - 1 \\ \Delta w_j \rightarrow \min\,(j = j') \end{array}\right\} \quad \cdots (7)$$

it is estimated that the transmitter has transmitted $S_{kp}^{j'}$. The polarity of $w_{j'}$ corresponds to the polarity of $S_{kp}^{j'}$.

Since the DEC output $[\hat{}b_{kpn}]$ is an estimated value of the multilevel signal, by adding it to a multi-binary level converter PS, I pieces of estimated binary data $\hat{}b_{kpn}$ are produced.

Thus, an M-ary transmission system for the p-th user in the k-th cell is composed. The invention is a system which uses ZCCZ sequence family as S_{kp}^{j} so as to avoid the disturbance caused by various interference components contained in $r^*(i)$, and the production method is explained below.

Please delete the first full paragraph on page 26 in its entirety.

Please delete the last paragraph bridging pages 26 and 27 in its entirety.

Please delete the first full paragraph on page 27 in its entirety.

Please delete the second full paragraph on page 27 in its entirety.

Page 37, first full paragraph, has been amended as follows:

Fig. [[12]] 11 is a block diagram of the base band circuits of CDMA transmitter-receiver in an embodiment of the invention, and the circuits can perform the isolated pilot assisting function mentioned above. Fig. [[12]] 11 (a) is a circuit diagram of the transmitter, in which b_{kpn} is the same as the symbol used in Fig. 2(a), and is the n-th binary transmission data. Further, ρ is the pilot information, and, for example, always $\rho = 1$. A pilot insertion circuit PI inserts ρ into the transmission data sequence [b] of b_{kpn} periodically at a certain frequency. A modulator MOD3 determines the polarity of the spreading sequence S_{kp} assigned to this user according to the respective bit information output [b]/ρ PI produces. This output is sent to a frame expansion circuit FE, in which spreading sequence b_{kp} $[S_{kp}(in)]_E$ is produced. Therefore, the transmission signal is represented by the following equation.

$$s(i) = b_{kp}\left[S_{kp}(i)\right]_E \quad \cdots (38)$$

where for the sake of simplicity, the symbol number n is omitted, and b_{kp} is used by assuming J = 1 for S_{kp}^{j}.

Page 38, first full paragraph, has been amended as follows:

Fig. [[12]] 11 (b) is a base band receiver circuit, in which r(n) is a received input, A is a gate, and e_D and e_p are timing signals for separating the general data symbols and the isolated pilot frames on the synchronously received symbols. The synchronous reception gate output $r_{kp}^{*}(n)$ is an input corresponding to the pilot frame transmitted by the p-th user of the k-th cell, and an analyzer P-AYZ analyzes it, and produces the correlation function output $\Lambda_{kp}(\tau)$. Here, because that intra-cell interference between users exists, but there is no inter-cell interference (k

may be a constant), P pieces of $\Lambda_{kp}(\tau)$ are obtained. They are accumulated in a memory MEM in a form of matrix Λ in Eqs. (36) and (37).